Knowledge in Transition in an Industrial Company

Abstract. This research examines knowledge transition in an industrial company. This study presents findings about methods and forms of interaction and knowledge transition between organizational actors in innovation processes. Methodology is qualitative and quantitative, as the data was collected through interviews and questionnaires techniques. This study contributes to the body of knowledge about knowledge transition in innovation processes, and empirically presents the impacts of knowledge transition in several dimensions of the organization activity. Finally, the study provides directions for avenues of future research, and suggests some research questions arising out of these findings that might be explored.

Keywords: Knowledge in transition, industry, case study, Innovation, organization.

1 Literature review

knowledge can be an enabler or a disabler of innovation (Sousa et al. 2015a; Sousa et al. 2015b) because individual knowledge transition and use is a very complex social interaction process (McAdam and McCreedy 1999; Nonaka, Toyama et al. 2000). To Davenport and Prusak (2000) "knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information". Other reference authors like Polanyi (1958) associate knowledge to action. He says that "knowledge is the ability to act". Nonaka and Takeuchi (1995) explain that knowledge is created by the flow of information associated with the beliefs and commitment of those who possess it. In the view of Nonaka and Takeuchi (1995), knowledge is created within the company to make it more successful, to keep it on the market, to increase competitiveness and to keep it ahead of its rivals.

Knowledge produced and carried by individuals only reaches its full potential to create economic value when it is embodied in organisational routines, that is, when it has been converted into organisational knowledge.

In this context kknowledge transition in organizations (Sousa, 2020) is currently based on information technology rather than in developing social relationships. However, it is needed a cultural and organisational transformation to promote knowledge transfer among employees. Kknowledge is needed to reorganize work routines and to be embed into new products and services, leading to sustained competitive advantage of organizations. However, this kind of knowledge is carried in the heads of individuals and the dilemma is how it can be embedded in organisational routines to fully maximize its utility – in this regard knowledge transition mechanisms and tools needs to be developed.

Nevertheless, information technologies are part of the essential infrastructure of knowledge transition, but it is not sufficient because knowledge involves thinking, an activity that only human beings are able to do. Extensive literature provides several examples of organisations skilful at knowledge transition and share (Zairi & Whymark, 2000), but most of these case studies do not fully explore why these organisations were successful at this endeavour. To fully understand how to grow this capability, it is probably necessary to understand what factors tend to affect knowledge transition. The literature within the knowledge domain provided the following five factors that might influence that process:

1. Relational channels, frequency, and depth of two-way human-to-human contact (Rulke, Zaheer, & Anderson, 2000)
2. Partner similarity, degree of similarity (i.e., interests, background, or education) between individuals (Almeida & Kogut, 1999; Darr & Kurtzberg, 2000)
3. Depreciation, loss of knowledge after the share (Argote, Beckman, & Epple, 1990; Darr, Argote, & Epple, 1995)
4. Organisational self-knowledge, what individuals know and use (Rulke, Zaheer, & Anderson, 2000)
5. Divergence of interests and congruency of individual and organisational goals (Alchian & Demsetz, 1972; Jensen & Meckling, 1976; Donaldson, 1990).

However, as Reid argued in his research “the most effective way to disseminate knowledge and best practice is through systematic transfer” (2003). And this can be accomplished in the implementation of knowledge transition routines (Sousa, 2013), leading to an organizational culture of knowledge.

2 Methodology

The methodological approach was the case study (Yin, 2014), and the data was collected through interviews and a questionnaire application:
a) Interviews: the main goal was to collect employees' opinion about the knowledge transition processes and the innovation process that was being implemented in the organisation.

b) Questionnaire: administered to the employees, distributed across various functional areas and job positions including Operators, engineers/Technicians (e.g., software systems, electrical, and project), Managers (e.g., project, marketing, process, and manufacturing), and directors (operations and marketing, production, software development).

3 Findings of the research

3.1 The context of the company regarding innovation and knowledge

The company began the whole innovation process by implementing a very structured system with several tools adapted to all organisational dimensions. One of the critical factors of success is the top management involvement in all the processes, and the willingness to create and implement a culture of innovation and change. This culture is being created daily, creating habits and behaviours of participation, communication, and involvement in all aspects – this constant change involves both micro and macro changes.

During the group recall sessions, almost all the actors have made suggestion of change, not only involving their workstations, but also the organisation itself. This culture of innovation and participation is deeply integrated in the company organisational life.

When we analyse the routines for creating and sharing knowledge, we can find several mechanisms used to facilitate the share: suggestion boxes, openness to make suggestions to the Managers, several types of workshops where employees from different sections participate, and several transversal projects of improvement, quality and maintenance.

Workers use the suggestion boxes as a space where they can uncover new ideas that help improve the organisation.

Cross-functional workshops and meetings are a crucial space to share perspectives and to make discussions that provide invaluable knowledge. Organisational actors share their opinions and insights, as well as their own questions, sharing and creating new knowledge. For added impact, outside specialists and even costumers participate in these sessions. Their perspectives can be

refreshing and break down the thinking routines of internal workers. Transversal projects or projects related to quality systems also are spaces for workers to share their knowledge and experiences.

3.2 Knowledge transition processes

The innovation process is a key factor because of the importance of implementing new ways of production and new organisational processes to accomplish higher efficiency. Involving workers in this process requires the use of management tools such as communication and the promotion of workers‟ involvement and participation. The company uses several mechanisms to promote knowledge share and develop new ideas. It is important to point out the suggestions system (mainly used to make production improvements), the workshops on innovations and new products, and the knowledge networks (specially the informal ones) (Table 1).

Table 1 – Knowledge Transitions Mechanisms

Knowledge Critical Area	Knowledge Transition Mechanisms	Organizational Actors (from)
• I&D	• Informal networks • Workshops • Documental tools • Prototype projects • IT systems • Networks	• I&D • Quality • Production • Maintenance
• Quality	• Informal Networks • Workshops • Documental tools • IT tools	• Quality • Production
• HR	• Informal Networks • Documental tools • IT tools	• Quality • Production
• Production & Maintenance	• Communication spots • Workshops • Informal Networks • Documental tools • IT tools	• Production • Quality • Maintenance
• Assembling	• Informal Networks • Documental tools	• Production • Maintenance • Quality

• Client Service		• Informal Networks • Documental tools • IT tools		• All

Looking for another perspective, we can say that the company is a learning space at a technical and organisational level. One of the most effective tools to create and disseminate knowledge is though workshops with people from different sections or people from just only one section.

Costumers and external specialist often participate in the workshops and help the discussion and the creation of new knowledge that helps implement new practices, tools, or technology.

The workshops in the company can be seen as knowledge creation and sharing processes, like the communities of practice or other processes of linking workers to others with expertise. Relational competences are a key to the capture, use and creation of new knowledge and learning within the company.

The participation of all organisational actors in innovation process helps to develop a more consistent knowledge-sharing culture. Employees share ideas and insights naturally and not as something they are forced to do. There is a connection between sharing knowledge and achieving the business goals or solving practical problems.

The knowledge transition process among sections and workers is very peculiar, as they implement a new practice, process, or technology in one specific workstation according to the Operator openness to change. When it is working perfectly and new and better results are achieved, they share this new knowledge to other workers and transfer it to their workstations, disseminating the new knowledge along the plant.

3.3 Knowledge transition impacts

Knowledge transition in the company has a huge impact on organizational routines:

In the **work organisation**, the level of responses is also very high, involving all hierarchical levels, and only Project teams and Services' externalization got very few responses.

Total Quality Management Programs	87,5%
New work processes	87,5%

Increasing planning processes	87,5%
Self-Quality Control	75%
Increasing dialogue	75%
Autonomous teams	75%
Network	62,5%
Project teams	12,5%
Services externalization	12,5%

Total Quality Management Programs were implemented with the definition of problem-solving routines and quality standards. *Self-Quality Control* has increased because of the new management practices and quality standards. New work processes are linked with innovation system principles and all the new and continuous change leading to an *increasing dialogue* among workers and managers. *Autonomous teams* refer to team's autonomy to solve some problems according to the workstation complexity. Increasing planning process through the innovation system instruments with the goal to reduce costs and to increases productivity.

Network refers to the informal relationship among workers and Managers to solve all the emerging problems and to find their specific solutions. Increasing dialogue with the creation of the communication corners, the realisation of the workshops and with the visual management procedures.

Services' externalization is only used when the organisation does not have the competencies needed to develop the work, and *project teams* is a concept which is not very clear in the company. Nevertheless, they work in teams in each section of the plant.

In the **technology** dimension it was mainly the Managers and Middle Managers that answered positively to *Acquisition of new information and communication technologies* and *Acquisition of new production technologies*.

Acquisition of new information and communication technologies	62,5%
Acquisition of new production technologies	50%

Acquisition of new information and communication technologies in office automation, and *acquisition of new production technologies* to increase productivity.

In **Product development** seems that some of the Operators do not see any change in the product's technical characteristics.

Technical characteristics	62,5%
Design	50%
Packaging	25%

Technical characteristics have specifically increased the quality of the projects, as *design* make them more modern and gave them style, nevertheless packaging does not seem to be relevant in the company activity.

In **Market** dimension ooperators do not seem to be aware of the organization's *Market Share* and its exploration of *New Markets worldwide*

Product and services quality	75%
New markets	50%
Market share	50%

Product and services quality have increased with the innovation system, *new markets* refer to entering the USA market, with the *market share* increasing since 2000.

Regarding **Process** all participants opinion are aligned and there has been an Increase of production capacity deriving from the organisation's knowledge share culture, and an increase of Production flexibility.

Increase of production capacity	100%
Production flexibility	87,5%
Work cost	62,5%

The *Increase of production capacity* is due to the continuous change in the work and organisation practices; and the *production flexibility* has increased with the autonomous teams and with the competencies matrix system

implemented in the plant; also *work coast* decreased especially due to the waste reduction and with the new stock management system.

Regarding **External relations** there was a high number of answers that pointed to the *Increasing relations with suppliers* and *Increasing relations with other organisations and community*. Operators do not point out *the Increasing relations with clients* because they do not have a direct contact with them.

Increasing relations with suppliers	87,5%
Increasing relations with other organisations	75%
Increasing relations with community	75%
Increasing relations with clients	50%

Increasing relations with suppliers got high marks because of the quality standards and because of costs reduction. Increasing relations with clients was attained by making them participate in the innovation process, and by the quality of post-sales support services that helped them solve problems with the equipment's. Increasing relations with other organisations and the community applies mainly to university developing Innovation Projects (namely the Aveiro University) and to the community's donations.

Almost all participants answered that there was a high level of **workers" participation** in the knowledge transition in the organization.

Improvement suggestions	100%
Meetings	87,5%
Technical problem solving	75%

Improvement suggestions through the suggestion's boxes and directly to the Managers. *Meetings* in the communication spots to discuss the problems and to discuss the new changes. *Technical problem-solving* routines are increasing and being improved to help solve the problems in lesser time and with less production costs.

In respect to **Knowledge management** Operators and some Technicians do not have the perception about the existence of a *Knowledge network* or *Best practices repositories*.

Knowledge network	50%
Best practices repositories	50%

Knowledge network refers mainly to informal networks to solve problems; and best practices repositories in databases that can be used for other sections or departments of the company.

4 Conclusions

The knowledge transition among employees support the innovation process of the company studied, and to support that transition the managers create a working environment with different thinking styles and without penalties for failure, encouraging experimentation. They also encourage an open culture, having fewer formal relations, implementing several activities for knowledge sharing.

To make the process of knowledge transition effective they promote trust among workers and between workers and Managers, with a culture of participation and involvement since the innovation system implementation. They also create routines, procedures sheets and knowledge databases for problems and solutions related to quality management, and problems and solutions – this facilitate the knowledge transition process.

There are also several impacts of the knowledge transition in the organization activities and dimensions, as work organizations, technologies, product development, market, process, external relations, workers‟ participation, and knowledge management systems.

Finally, it seems to be important to point out that few researchers have examined the transition of knowledge in innovation processes. This is probably since innovation and knowledge are difficult to measure. With this research the goal was to clarify the knowledge transition mechanisms used in innovation processes. Furthermore, future studies are required to determine the importance of different types of knowledge in transitions processes in different organizational activities

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